

## Polymobil 10

**SP**

### Maintenance Instructions

Maintenance protocol  
RXR8-120.105.01.05.02 is required for  
these instructions

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Chapter	Page	Rev.
All	All	05

## Document revision level

The document corresponds to the version/revision level effective at the time of system delivery. Revisions to hardcopy documentation are not automatically distributed.

Please contact your local Siemens office to order current revision levels.

## Disclaimer

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## System check at the start of the preventive maintenance

The system condition should be checked through remote service (if available). If error reports occur the required spare parts will need to be ordered. If necessary, make a new appointment for preventive maintenance.

You need to conduct a quick test directly on the system. To do this, you can use quality assurance or similar procedures.

Check if the system log contains any system problems (if available).

Any anomalies require that the necessary escalation measures be initiated. If necessary, make a new appointment for preventive maintenance.

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1 General information

1.1 Required documents

- |                             |                    |
|-----------------------------|--------------------|
| • Maintenance protocol      | RXR8-120.105.01... |
| • Service instructions      | RXR8-120.061.01... |
| • Operator manual           | RXR8-120.201.01... |
| • Block Diagram             | X050I              |
| • Function Description      | RXR8-120.041.01... |
| • Technical safety checks * | SP00-000.834.01... |

\* Within the purview of DIN VDE 0751-1, we recommend documenting the maintenance results both in the maintenance protocol and in the TSC protocol. The protocols should be filled out completely and handed over to the client after maintenance is completed.

1.2 Tools, measurement and auxiliary equipment required

NOTE

All tools, measuring equipment and aids, with the exception of those marked with "\*\*", are listed and specified in the STC ('Service Tools Catalogue').

- Standard service tool kit \*
- 2-channel storage oscilloscope
- Ground wire test meter
- Device leakage current measuring device
- Torque wrench 20-100 Nm
- Loctite 242

1.3 Required lubricants

- |                               |                                  |                           |
|-------------------------------|----------------------------------|---------------------------|
| • Multi-purpose WD-40 spray   |                                  | 28 70 061                 |
| • Optimol Longtime PD2 grease | 0.71 oz (20 g)<br>2.20 lb (1 kg) | 34 91 271 or<br>73 95 445 |

## 1.4 Emphasized texts



**DANGER** indicates an immediate danger that if disregarded will cause death or serious physical injury.



**WARNING** indicates a possible danger that if disregarded can cause death or serious physical injury.



**CAUTION** used with the safety alert icon indicates a possible danger that if disregarded will or can lead to minor or moderate physical injury and/or damage to property.



**NOTICE** used without the safety alert icon indicates a possible danger that if disregarded may or will lead to an undesirable result or state other than death, physical injury or property damage.



**NOTE** is used to indicate information which explains the proper way to use devices or to carry out a process, i.e. which provides hints and tips.

## 1.5 Safety information and protective measures

### **WARNING**

**Danger of injuries, death or material damage.**

Non-compliance can lead to death, to injuries or to material damage.

#### **Note**

- the product-specific safety notes in these instructions,
- the general safety information in the document TD00-000.860.01... and
- the safety information in accordance with ARTD part 2.

### **WARNING**

**X-ray radiation!**

Non-compliance can lead to illnesses, irreversible damage to body cells and the genotype, severe injuries and even death.

When performing work on the system during which radiation must be released, the radiation protection directives and the rules for radiation protection according to ARTD 02.731.02 must be complied with.

#### **Please note:**

- Use available radiation protection devices.
- Wear radiation protection clothing (lead apron).
- Stay as far away as possible from the radiation source.
- Release radiation only if necessary.
- Set radiation activity as low as possible.  
(Low kV and mAs values)
- Release radiation for as short a time as possible.

Checks in which radiation must be released are identified by the radiation warning symbol.



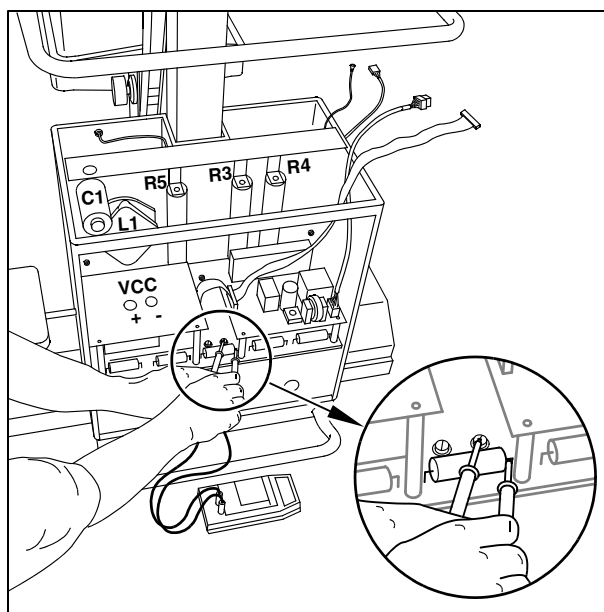


Fig. 1





When working on an open system there is danger of electric shock.

Disregarding this could result in death or injury.

Please note:

- The capacitors may still contain a charge. Do not carry out any work while the system is under charge.
- After power has been switched off, there is still approximately 350 V DC present in the unit (even after disconnecting the power plug). Once the unit has been switched off the voltage will be reduced to about 10 V within 10 minutes.
- It is imperative that you determine the actual voltage by connecting the DVM to the -VCC and + VCC measuring points on the inverter board D 960 or (for easier access) by connecting it to the + connection point of the C3 capacitor and to the right-hand side of the F3 fuse on the capacitor board D 970 (see Fig. 1).
- The LEDs V1 ... V10 on the D 970 go out even when a much higher voltage is reached, thus not providing sufficient security.
- If a fuse on the D 970 reacts, the corresponding capacitor might contain high voltage for quite some time!
- The capacitor discharge circuit is looped via the D 925 relays CS and LS. If the X3 or the X9 plug on the D 925 or D 950 is not plugged in or if the loop is defective, the C packet will not be discharged.  
This may cause life-threatening voltage to be present in the unit for a considerable amount of time!
- See the section for "Replacing the capacitor packet" in the POLYMOBIL 10 RXR8-120.061.01... service manual.

- Only connect the POLYMOBIL 10 to a power supply (wall outlet) whose installation corresponds to the requirements according to VDE 0107 or the national regulations.
- Prior to any intervention, switch the POLYMOBIL 10 off using the power **OFF** switch on the control console, and **disconnect the power plug**.
- Install or remove boards only with the generator switched off while observing the ESD guidelines.

## 1.6 Description of abbreviations

Abbrev.	Description
SI	Safety inspection
SIE	Electrical safety
SIM	Mechanical safety
PM	Preventive maintenance
PMP	Periodic preventive maintenance
PMA	Preventive maintenance adjustments
PMF	Preventive operating value check and functional check
Q	System quality, image quality
QIQ	Image quality
QSQ	System quality
SW	Software maintenance

The steps indicated by these abbreviations also appear in the Maintenance Protocol as items which can be checked off.

## 1.7 Information on the protective conductor resistance test

Observe the instructions in the safety rules for installation and repair (ARTD-002.731.17 ...).

The protective conductor resistance is to be measured, documented, and evaluated during maintenance.

### NOTE

**Evaluate the results by comparing the first measured value to the corresponding values documented during preceding maintenance procedures or safety checks.**

**A sudden or unexpected increase of the measured values, even if the limit value of 0.2 ohms is not exceeded, indicates errors in the ground wire connections. (Ground wire or contacts.)**

The measurement must be made according to DIN VDE 0751, Part 1 (see ARTD Part 2). In this case the ground wire resistance in the normal operating condition to all conductive touchable parts of the system must be measured.

Make sure that control cables or data cables between the system components do not imitate a ground wire connection.

During the measurement, move the power cable and additional connection cables with an integrated protective conductor section by section to detect cable breaks.

The protective conductor resistance must not exceed 0.2 Ohms.

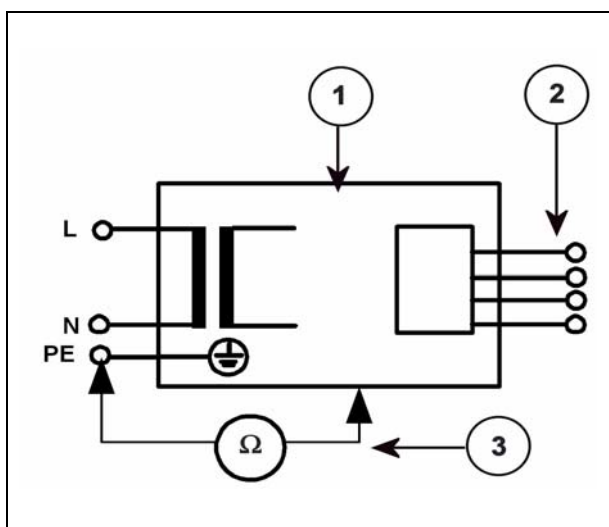


Fig. 2 Measuring circuit for measuring the protective conductor resistance in systems that are disconnected from the power supply, according to DIN VDE 0751-1/2001-10, Fig. C2.

1 = System

2 = Applied part, type B (if present)

3 = Measuring arrangement (integrated in the measuring instrument)

The values determined must be recorded and assessed in the protective conductor resistance report and include the measured points.

Document the measuring procedure and the measuring instrument used (designation and serial number).

#### NOTE

**The protective conductor resistance report is filed in the "Certificates" register in the system binder.**

#### NOTE

**A new report must be created if the protective conductor resistance measurements are not documented.**

**These instructions contain a new report called 'Protective conductor resistance/report'. Separate this report, fill it out, and file it in the system manual under "Certificates". If values are newly determined, they are to be recorded as first measured values. The evaluation is omitted in this case.**

## 1.8 Information on measuring the system leakage current

**NOTE**

The system leakage current measurement is to be conducted and recorded as the repeat measurement during maintenance.

However, the first measured value must be newly determined and a new report must be created under the following conditions:

- Lack of leakage current measurement documentation
- Deviation of the local line voltage from the line voltage documented in the report (e.g., change of location or operator)
- Use of a different procedure for measuring the leakage current than the one documented in the report.

For the purpose of traceability, reference to the new report must be written on the old report. The reason for newly determining the first measured value must be documented and confirmed with a name and signature.

Observe the instructions in the safety rules for installation and repair (ARTD-002.731.17 ...).

**⚠ WARNING****Electrical voltage!**

Non-compliance can lead to severe injury and even death.

The system leakage current measurement may be performed on systems of protection class I only after the protective conductor test has been passed.

**First measured value**

The first measured value has already been determined and documented in the leakage current report. The measuring procedure was also recorded.

The measurement was performed with the recorded line voltage and with the recorded measuring equipment.

**Measurement**

Perform the measurement according to DIN VDE 0751, Part 1 (see ARTD-002.731.17....), and record the determined value.

The measuring procedure indicated in the report must be used.

If the first measured value has to be re-determined (see previous note), it is possible to select the measuring method (direct measurement or difference measurement).

Measurement of the system leakage current according to the differential current method (measuring arrangement according to Fig. 3) must be given preference, since no danger for the person performing the measurement and other persons arises during the measurement.

However, please note the minimum resolution of the leakage current measuring instrument and any additional manufacturer's data restricting the use of the measuring device.

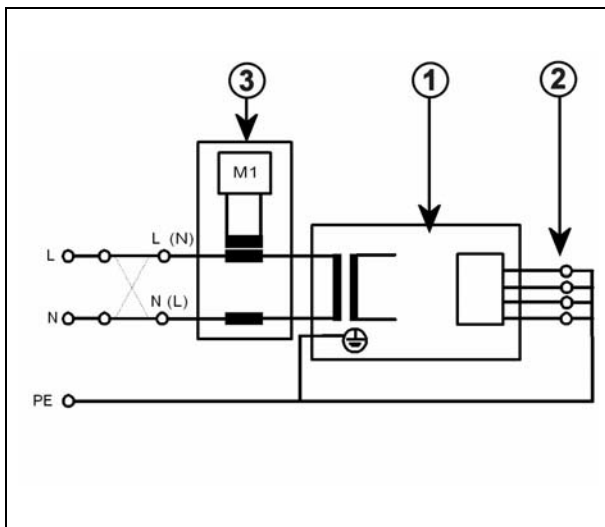


Fig. 3 Measuring circuit for measuring the system leakage current using the differential current method according to DIN VDE 0751-1/2001-10, Fig. C6 for protection class I.

- 1 = System
- 2 = Applied part, type B (if present)
- 3 = Measuring arrangement (integrated in the measuring instrument)

If the direct measurement of the system leakage current is used (measuring arrangement according to Fig. 4), then the system must be set up insulated during the measurement and must not be touched during the measurement.

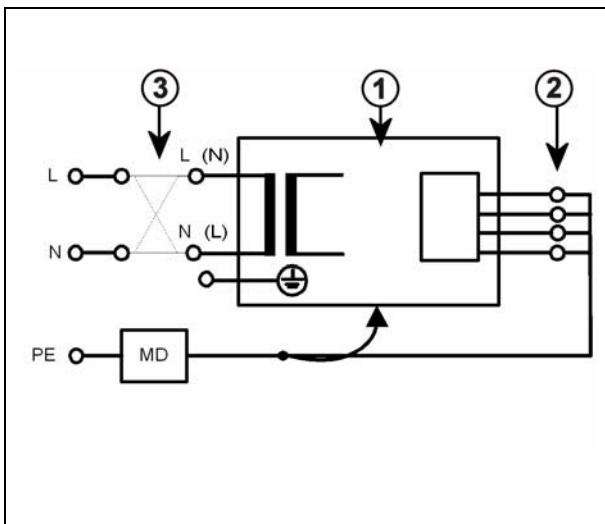


Fig. 4 Measuring circuit for the direct measurement of the system leakage current according to DIN VDE 0751-1/2001-10, Fig. C5 for protection class I.

- 1 = System
- 2 = Applied part, type B (if present)
- 3 = Measuring arrangement (integrated in measuring instrument)

**⚠ WARNING****Electrical voltage!**

**Non-compliance can lead to severe injury and even death.**

**No housing parts of the system may be touched during direct measurement of the system leakage current (measurement setup according to Fig. 4).**

**Access to the system by third parties must be prevented.**

The system must be switched on during the measurement. Measuring devices with automated measuring sequences must therefore be set to manual measurement.

Enter the highest value into the leakage current report.

This value must not exceed the permissible leakage current values of 2.5 mA according to DIN VDE 0751-1/2001-10, Table F.1, row "System leakage current for devices according to remarks 1 and 3".

Measure and record the current line voltage. If the measured line voltage deviates from the nominal voltage, correct the measured value to the value corresponding to a measurement at the nominal value of the line voltage. This is also to be documented.

Document the measuring procedure (differential measurement or direct measurement) and the measuring device used (designation and serial number).

In the case of repeat measurements, the measured value must also be evaluated.

**NOTE**

**Evaluate the results by comparing the first measured value to the corresponding values documented during preceding maintenance procedures or safety checks.**

**A sudden or unexpected increase of the measured values may indicate that a fault has occurred in the primary circuit of the power supply (damaged insulation, damage caused by humidity, defective interference suppressor, etc.) - even if the limit value of 2.5 mA is not exceeded.**

The evaluation is not necessary in the case of a new determination.

File the leakage current report in the "Certificates" register in the system binder.

**NOTE**

**The leakage current report is filed in the "Certificates" register in the system binder.**

**NOTE**

**A new report must be created if the leakage current measurements are not documented.**

**These instructions contain a new report called 'Leakage current/report'. Separate this report, fill it out, and file it in the "Certificates" register in the system manual. If values are newly determined, they are to be recorded as first measured values. The evaluation is omitted in this case.**

## 1.9 Technical Safety Checks (TSC)

Abbreviation: TSC = Technical Safety Checks

### NOTE

Within the purview of DIN VDE 0751-1, the operator of medical engineering products has to perform technical safety checks at regular intervals.

The checks listed in these maintenance instructions include all technical safety checks required by DIN VDE 0751-1.

A separate report with print number SP00.000.834.01... is available for each technical safety check.

Within the purview of DIN VDE 0751-1, we recommend documenting the maintenance results both in the maintenance report and in the TSC report. The reports should be filled out completely and handed over to the client after maintenance is complete.

The table below assigns each technical safety check listed in document SP00.000.834.01... to the corresponding maintenance work.

Test certificate for 'Technical safety checks'	Maintenance instructions, Test/Comments
1 Identification data	Please fill in the fields.
2 General checks	n.a.
2.1 Visual inspection: Is there any damage affecting safety?	2.1.1 Check the system for damage; checks: SIM Covers SIM switch box/control console SIM Release cable SIM Power and primary cable
2.2 Are all cables and cable guides secure and without any visible damage?	2.1.1 Check the system for damage; checks: SIM Release cable SIM Power and primary cable
2.3 Are undamaged accessories being used?	n.a.
2.4 Radiation protection equipment for the devices present and not damaged? (no radiation protection of the building)	2.9 Radiation; tests: SIE Radiation indicator SIE Acoustic signal

Tab. 1

Test certificate for 'Technical safety checks'	Maintenance instructions, Test/Comments
2.5 Are the required operator documents complete, present and legible?	2.1.3 Customer documents; check: SI Customer documentation  Ask the customer for additional required operator documents and check them for completeness, availability, and legibility.
2.6 Are all warning labels in place and recognizable?	2.1.2 Labels; check: SIM labels
2.7 Are the operating symbols, light indicators and button labels OK?	2.9 Radiation; check: SIE Radiation indicator 2.10 Control console; checks: SIE Operating devices SIE Displays
3. Electrical checks	n.a.
3.1 Measurement of protective conductor resistance	2.11 Protective conductor test; check: SIE Protective conductor test
3.2 Leakage current or equivalent leakage current measurement	n.a.
3.2.1 Leakage current measurement	2.12 Leakage current measurement; check: SIE Leakage current measurement
3.2.2 Equivalent leakage current measurement	n.a.
3.3 Patient leakage current or equivalent patient leakage current measurement	n.a.
3.3.1 Patient leakage current measurement	n.a.
3.3.2 Equivalent patient leakage current measurement	n.a.
4. Mechanical checks	n.a.
4.1 Are all wall, ceiling and floor mountings secure and undamaged?	n.a.
4.2 Are all mechanically moved system parts clean and running smoothly (lubricated, if required)?	2.8 Stand; check: SIM Support arm locking mechanism 2.6 Single tank; check: SIM Locking mechanism 2.7 Double-slot diaphragm, check: SIM Rotatability

Tab. 1



Test certificate for 'Technical safety checks'	Maintenance instructions, Test/Comments
4.3 Cables, chains, belts, and spindles without signs of wear?	2.8 Stand; check: SIM Chains of the spring counterbalance system
4.4 Mobile equipment: Are the wheels, rollers and brakes OK?	2.2 Screws; check: SIM Front wheels 2.4 Wheels; checks: SIM Noises SIM Freedom of motion SIM Wear of the rubber lining 2.5 Pedal positions; check: SIM brakes/locking
4.5 Is there any unusual noise during operation (e.g., gearing)?	2.4 Wheels; check: SIM Noises 2.8 Stand; check: SIM Spring counterbalance system
5. Functional checks	n.a.
5.1 Function of the Emergency Stop switch	n.a.
5.2 Are the warning devices functioning properly?	2.9 Radiation; checks: SIE Radiation indicator SIE Acoustic signal
5.3. Do all system movements stop properly in their end positions?	n.a.
5.4 Does the collision protection device stop all system movements properly (e.g., collision protection)?	n.a.
5.5. Are all safety distances (wall, floor, ceiling) met or ensured by other appropriate measures (such as light barriers)?	n.a.
5.6. Are the other safety shutdown devices functioning properly (e.g., safety floor plate)?	n.a.
5.7 Are the positions of the table and system reproducible (e.g., zero positions, layer height, etc.)?	n.a.

Tab. 1

Test certificate for 'Technical safety checks'	Maintenance instructions, Test/Comments
6. Product-specific checks	2.2 Screws; checks: SIM Cassette holder SIM Pedals 2.3 Handles; checks: SIM Single tank holder SIM Single tank SIM Control handle over the control console 2.5 Pedal positions; checks: SIM Maneuvering SIM Straight travel 2.6 Single tank; check: SIM Mounting 2.8 Stand; check: SIM Stand mounting
7. Test result/evaluation	Evaluate the long-term trends of the protective conductor resistance and the leakage current by comparing the current measuring values to those of the preceding technical safety checks. A sudden or unexpected increase in the measured values may indicate a safety-related defect - even if the limit values are not exceeded.  Enter the results of the check.  Have the operator, or a person authorized by the operator, sign the TSC report.  Hand the TSC report over to the operator, or a person authorized by the operator.

Tab. 1

## **2 Inspection and maintenance**

### **2.1 Visual inspection**

#### **2.1.1 Check the system for damage**

- If necessary, repair or replace damaged parts.

**SIM Cover Panels**

**SIM Switchbox/control console**

**SIM Release cable**

**SIM Power and primary cable**

- Check the cables for damage or brittleness.  
Pay special attention to the cables at the pivot points of the flexible hose!
  - Ensure that the holder is secure at points where the cables are subject to particular stress due to movement.

#### **2.1.2 Labels**

**SIM Labels**

- Check all labels on the system with the model and serial numbers as well as warnings. The placement of these labels is described in the operating instructions (chapter "Positioning the Information Signs").
- Verify that all labels are present and legible.

#### **2.1.3 Customer documentation**

**SI Customer documentation**

- The operator manual must be available at the customer site.
- The operator manual is to be checked for availability, completeness, and legibility.

### **2.2 Check screws**

- Make sure that they are secure and tighten them if necessary:

**SIM Cassette holder**

**SIM Pedals**

**SIM Front wheels**

### **2.3 Check handles**

- Make sure that the handles are secure and tighten them if necessary:

**SIM Single tank holder**

**SIM Single tank**

**SIM Control handle over the control console**

**NOTE**

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If screws or securing elements are replaced, the screw locks must also be replaced.

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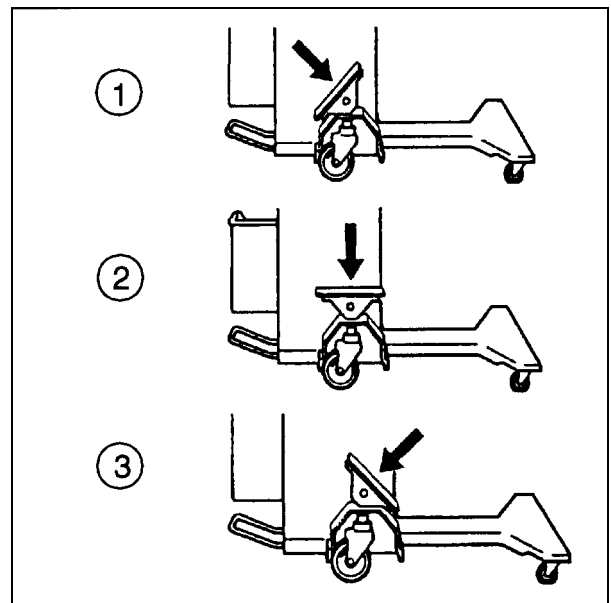


Fig. 1

## 2.4 Checking the wheels

**SIM** Noises

**SIM** Freedom of motion

**SIM** Wear of the rubber lining

- Check the wheels for noises, freedom of motion, and wear of the rubber lining and replace them if necessary (see the service instructions "Replacing the Steering Roller").

## 2.5 Checking the pedal positions

- If the following functions are no longer guaranteed, completely replace both steering rollers (see the service instructions "Replacing the steering rollers").

**SIM** Brakes/locking

- Pedal positions as shown in 1/Fig. 1
  - ⇒ The rear wheels are locked.  
The unit is engaged and cannot be moved.

**SIM** Maneuvering

- Pedal positions as shown in 2/Fig. 1
  - ⇒ The rear wheels can swivel freely.  
The unit can be moved into any direction (from a standing position).

**SIM** Straight travel

- Pedal positions as shown in 3/Fig. 1
  - ⇒ The unit can be moved forward or backward.  
It is steered through the front wheels.

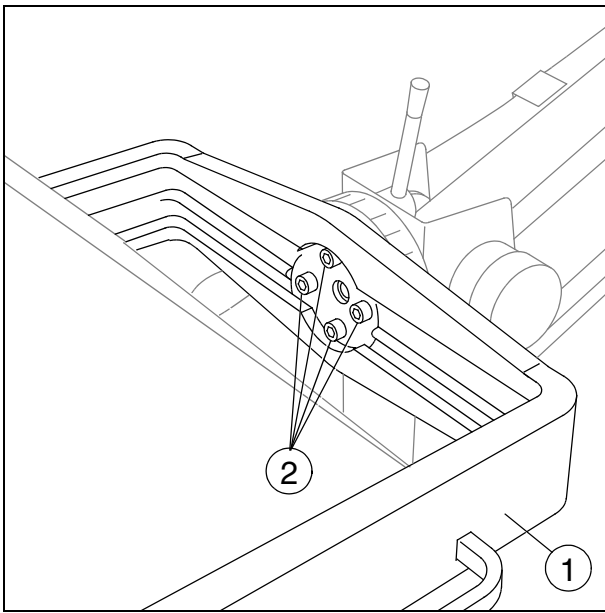


Fig. 2

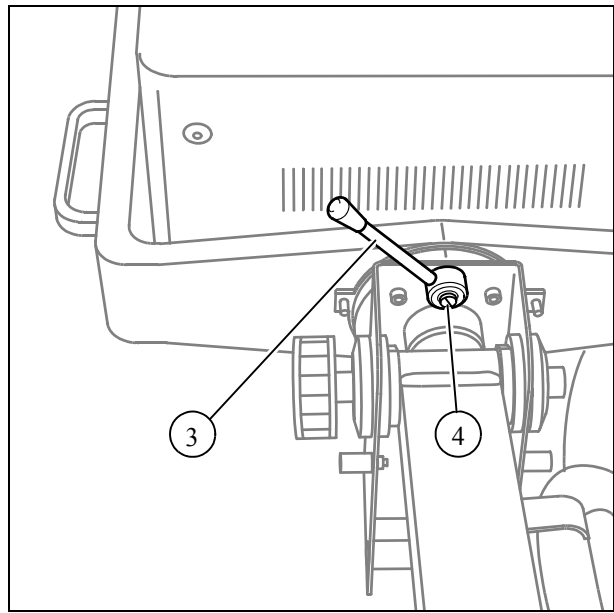


Fig. 3

## 2.6 Single tank

### SIM Mounting



- The single tank holder (1/Fig.2) including the single tank must fit securely on the flange of the support arm.
- Check the torque of the 4 mounting screws (2/Fig.2);  
PLANNED TARGET: 25 Nm, Tolerance:  $\pm 10\%$ .

### SIM Locking mechanism

- Ensure that the clamp handle (3/Fig.3) is secure, and tighten it if necessary.
- When unlocked (clamp handle (3/Fig.3) to the left), the single tank can be easily moved to all sides.
- Check locking mechanism:  
Tighten the clamp handle (3/Fig.3) to the right  
The single tank must be secure so that it cannot be turned

#### Readjust the locking mechanism:

- Tighten the clamp handle (3/Fig.3) to the right until it locks into position.
- Remove the clamp handle screw (4/Fig.3), and use the screwdriver to press the clamp handle away from the axle.
- Attach the clamp handle in the vertical position and tighten the screw (4/Fig.3).
- Recheck the locking mechanism of the single tank.

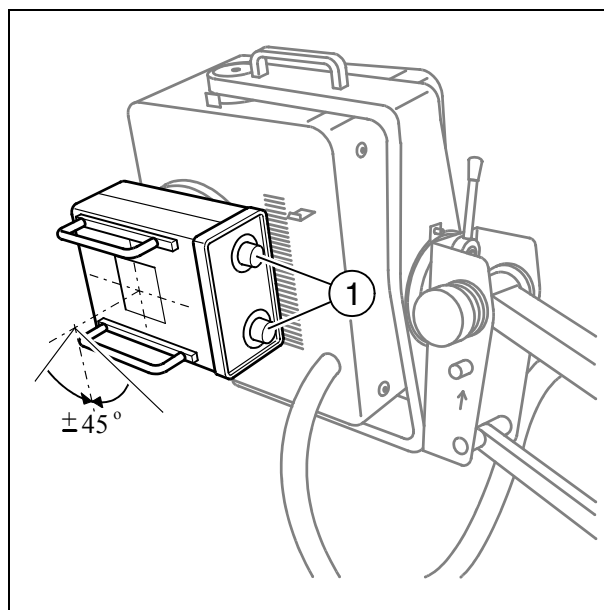


Fig. 4

## 2.7 Double-slot diaphragm

- Connect the power plug, POLYMOBIL **ON**.

### PMF Light localizer lamp

- Check if the light localizer lamp works, and replace it if necessary.  
See "Changing the light localizer lamp" in the service instructions.

### SIM Rotatability

- Check if the double-slot diaphragm can be turned easily at  $\pm 45^\circ$  (Fig.4).

### PMF Format setting

- By turning the collimator adjustment grips, check for easy movement and evenness of the format setting (pairs of plates).
- POLYMOBIL **OFF** and disconnect the power plug.

### PMF 0° position

- Move the support arm to the top position.
- Use the spirit level on the double-slot diaphragm to check the 0° position. If necessary, readjust the scale on both sides.

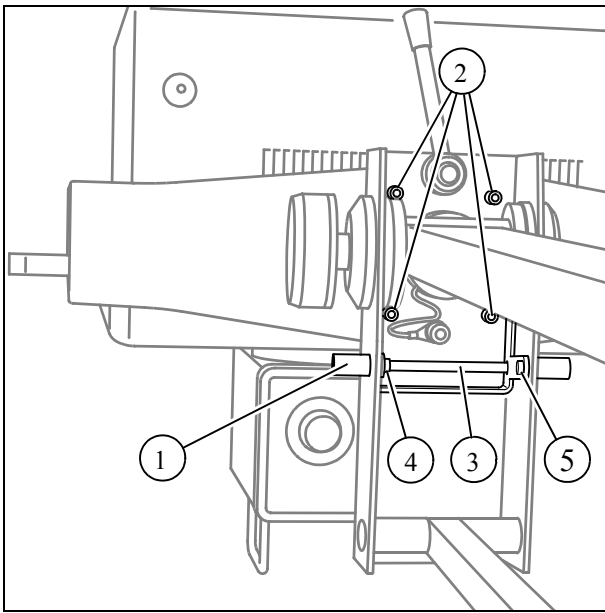


Fig. 5

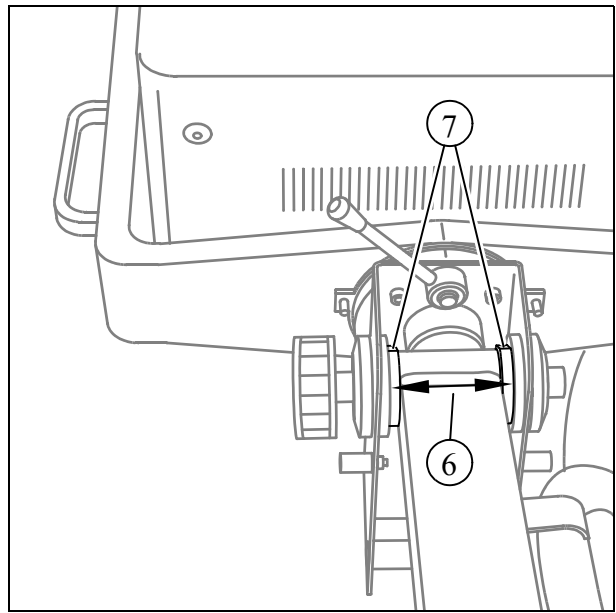


Fig. 6

## 2.8 Stand

### SIM Support arm locking mechanism

- Move the support arm into a horizontal position after releasing the locking mechanism (1/Fig.5).
- Tighten the 4 Allen screws (2/Fig.5).
- Move the arm system into the click-stop position. The central locking bolt must automatically and **audibly** move into the click-stop position without any frictional resistance.
- Check the axle (3/Fig.5) for play and the locking rings (4/Fig.5) for a secure fit.
- Check the nuts of both grip bolts (5/Fig.5), and tighten if necessary.
- Check the edges of the locking disks (6/Fig.6). They must **not** be worn.
- Ensure that there is play (without any friction) on all sides of the locking bar in the stand head (7/Fig.6).



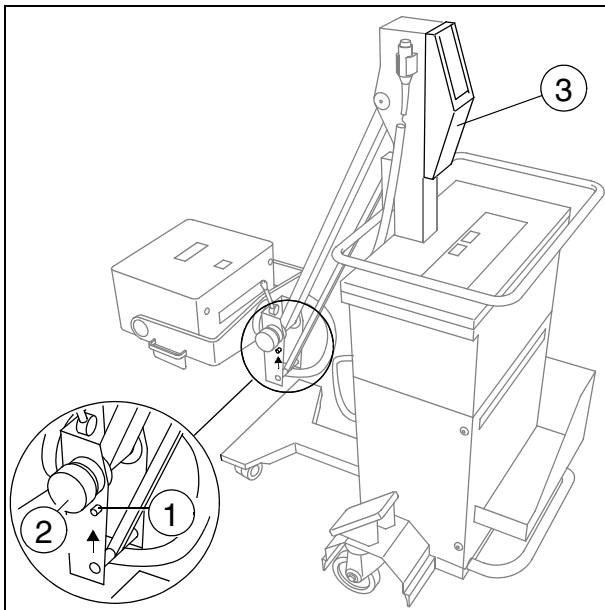


Fig. 7

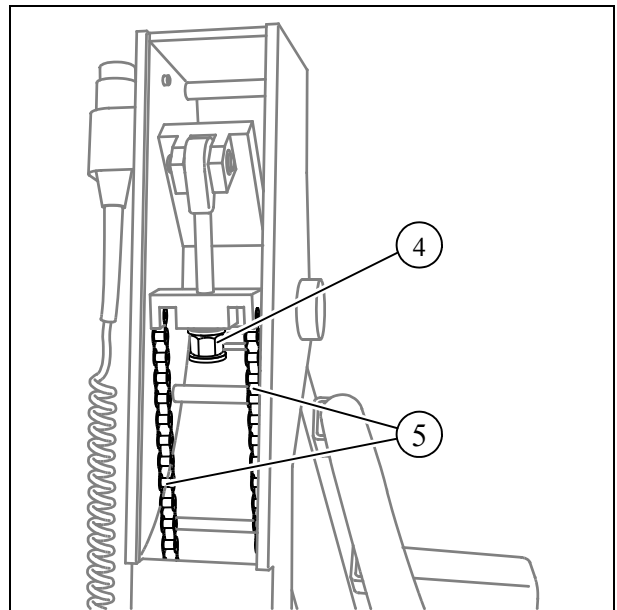


Fig. 8

## **SIM Stand mounting**

- Ensure that the stand is secure.

## **SIM Spring counterbalance system**

- Release the support arm from the (moving) park position (1/Fig.7).
- Move the support arm slowly to the top position.  
The support arm must maintain any position without using attached accessories and without activating the auxiliary brake (2/Fig.7).
- Use the rotary sleeve (2/Fig.7) to check the support arm's additional fixation points.

### **Readjust the spring tension:**

- Remove cover (3/Fig.7) from the stand.
- Release the auxiliary brake on the support arm (2/Fig.7) completely.
- Move the support arm into the horizontal position.
- Tighten the nut (4/Fig.8) with a 17 mm fork wrench.

Adjust the spring tension to achieve equilibrium when the support arm is in the horizontal position, so that the forces for raising and lowering the tube assembly are the same.

## **SIM Chains of the spring counterbalance system**

- Remove cover (3/Fig.7) from the stand.
- Carefully check the condition of the spring counterweight chains (5/Fig.8). Replace the stand column if the chains are defective.

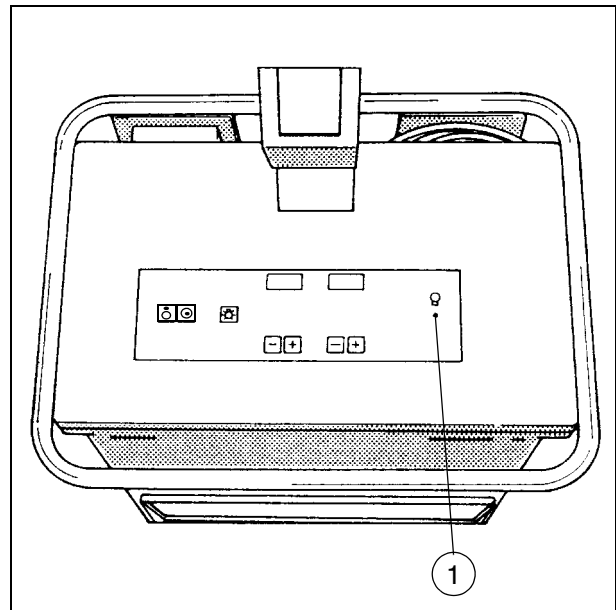


Fig. 9

### PMP Maintenance of the joints and chains

- Spray the stand joints with multi-purpose WD-40 spray.
- Lubricate the chains (5/Fig.8) using Optimol Longtime PD2 grease.
- Attach cover (3/Fig.7) to the stand.

## 2.9 Radiation

- Connect the power plug, POLYMOBIL **ON**.
- Close the double-slot diaphragm, and specify 60 kV, 10 mAs.

### SIE Radiation indicator

### SIE Acoustic signal

- Trigger exposure.  
The radiation indicator (1/Fig.9) must be lit during exposure, and an acoustic signal will sound at the same time.
- POLYMOBIL **OFF** and disconnect the power plug.

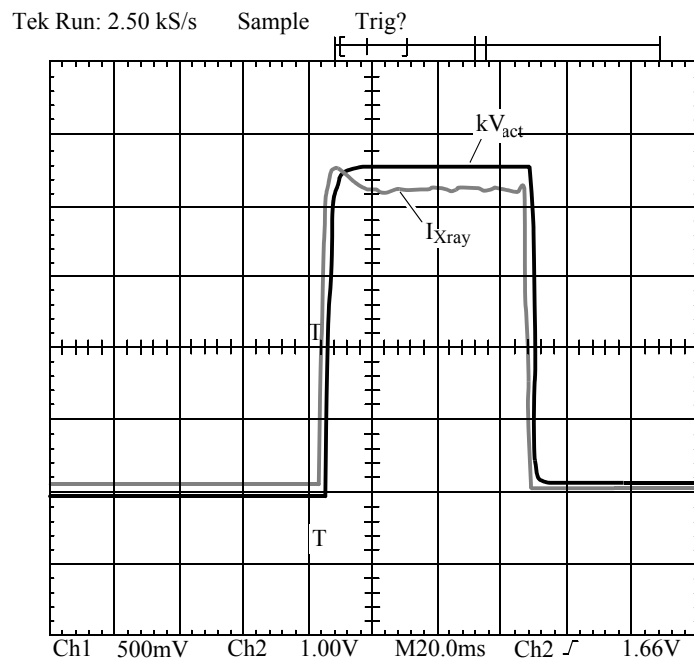


## PMF kV and tube current (IR)

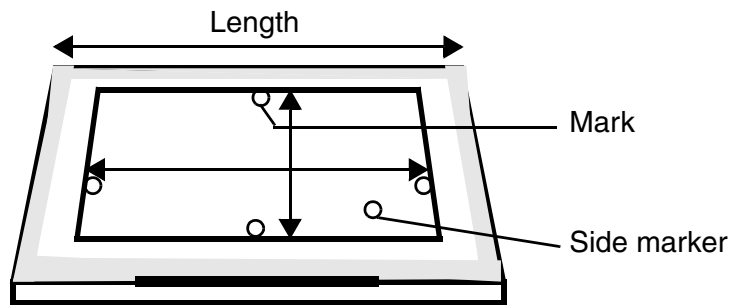
- Remove the 4 Allen screws, and then remove the upper control box cover.
- Connect the oscilloscope:  
CH1: D915.IR  
CH2: D915.kV (1 V  $\triangleq$  20 kV actual value)  
and D915.GND



- Connect the power plug, POLYMOBIL **ON**.
- Trigger exposure with 90 kV, 10 mAs.



- If the oscillogram is not produced, perform an adjustment according to the service instructions.
- POLYMOBIL **OFF** and disconnect the power plug.
- Close the control console.

**QSQ Checking coincidence of light field and radiation field**

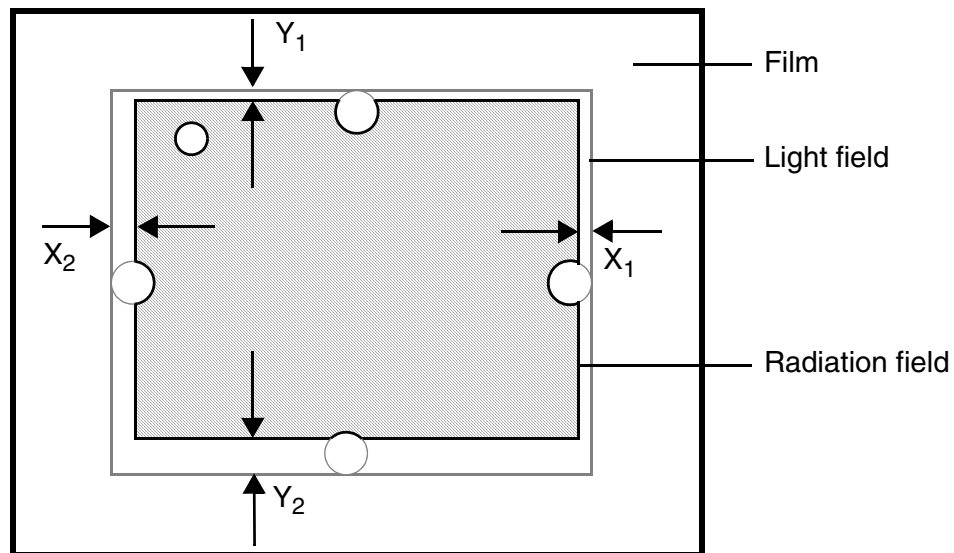
- Connect the power plug, POLYMOBIL **ON**.
- Load a 24 cm x 30 cm or 10" x 12" cassette with film and place it on a table or similar support.
- Use a tape measure to set a vertical SID of 100 cm or 40" to the top edge of the cassette.
- Use the control knobs to set a format of 18 cm x 24 cm or 8" x 10".
- Switch the light localizer on and align the cassette.
- Place radio-opaque marks (e.g. washers, coins) on the cassette as shown in the diagram.  
Use a washer as side marker.



- Release exposure (60 kV, 10mAs), and process the film.
- Make a note on the processed film of the following data using a waterproof felt tip pen:
  - Adjusted SID
  - Film size
  - Radiation field size

## Evaluation:

- Measure the deviations ( $X_1$ ,  $X_2$ ,  $Y_1$ ,  $Y_2$ ) between the edges of the light field and the edges of the radiation field on all four sides as shown in the diagram.
- Calculate the overall difference in the X and Y directions (without regard to the mathematical sign in front).



- The length deviation ( $\Sigma Y$ ) as well as the width deviation ( $\Sigma X$ ) must be less than 1.6 cm in each case.

## NOTE

In the case of deviations greater than 1.6 cm, see the "Coincidence of the Light Field and Radiation Field" chapter of the service instructions.

## 2.10 Control console

### SIE Operating elements

### SIE Indicators

- Check the operating elements and indicators on the control console.
  - See "Overview of the Operating Elements" in the operator manual.
- POLYMOBIL **OFF** and disconnect the power plug.

## 2.11 Protective conductor test

### SIE Protective conductor test

Observe the protective conductor resistance test information in these instructions.

- The protective conductor test is to be performed on a closed system according to ARTD-002.731.17...
- The protective conductor resistance must not exceed 0.2 Ohms.
- The values determined must be recorded and assessed in the protective conductor resistance report and include the measured points.
- In addition, document the measuring method and the measuring instrument used (designation and serial number).

**NOTE**

The protective conductor resistance report is filed in the "Certificates" register in the system binder.

**NOTE**

A new report must be created if the protective conductor resistance measurements are not documented.

These instructions contain a new report called 'Protective conductor resistance/report'. Separate this report, fill it out, and file it in the system manual under "Certificates". If values are newly determined, they are to be recorded as first measured values. The evaluation is omitted in this case.

## 2.12 Leakage current measurement

### SIE Leakage current measurement

Observe the leakage current measurement information in these instructions.

- The system leakage current must be measured on a closed system according to ARTD-002.731.17...

You must use the measuring method indicated in the report. If the first measured value needs to be re-determined, you can select the measuring method (direct measurement or differential measurement).

The limit value of 2.5 mA must not be exceeded.

- Document the measuring procedure (differential measurement or direct measurement) and the measuring device used (designation and serial number).
- Measure and record the current line voltage. If the measured line voltage deviates from the nominal voltage, correct the measured value to the value corresponding to a measurement at the nominal value of the line voltage. This is also to be documented.
- The highest value is to be entered in the leakage current report and evaluated.

#### NOTE

**The leakage current report is filed in the "Certificates" register in the system binder.**

#### NOTE

**A new report must be created if the leakage current measurements are not documented.**

**These instructions contain a new report called 'Leakage current/report'. Separate this report, fill it out, and file it in the "Certificates" register in the system manual. If values are newly determined, they are to be recorded as first measured values. The evaluation is omitted in this case.**

**2.13 Concluding work****PMP Cleaning**

Prior to cleaning, switch the POLYMOBIL off and disconnect it from the power supply.

Rub the POLYMOBIL with a moist cloth or cotton pad. Use water or a lukewarm, diluted, watery household cleaning solution.

Do not use scouring cleaning agents or organic solvents or solvent-based cleaning agents (for example, benzine, alcohol, spot remover) because of potential incompatibility with the material!

Do not spray the POLYMOBIL! Never let cleaning agents get into the POLYMOBIL!



**Protective conductor resistance/report**

System: \_\_\_\_\_

Material number: \_\_\_\_\_

Serial number: \_\_\_\_\_

Customer-spec. ident number: \_\_\_\_\_

	Protective conductor resistance					
	First measured value	Repeat measurement values				
Meas. point 1: _____						
Meas. point 2: _____						
Meas. point 3: _____						
Meas. point 4: _____						
Meas. point 5: _____						
Meas. point 6: _____						
Meas. point 7: _____						
Meas. point 8: _____						
(*1) Meas. circuit:						
Meas. inst. type:						
Meas. inst. Ser. No.:						
Meas. inst. calibrated up to:						
Assessment:	n.a.					
Date:						
Name:						
Signature:						

(\*1) Meas. circuit: see Fig. 1, next page

## Measuring circuit

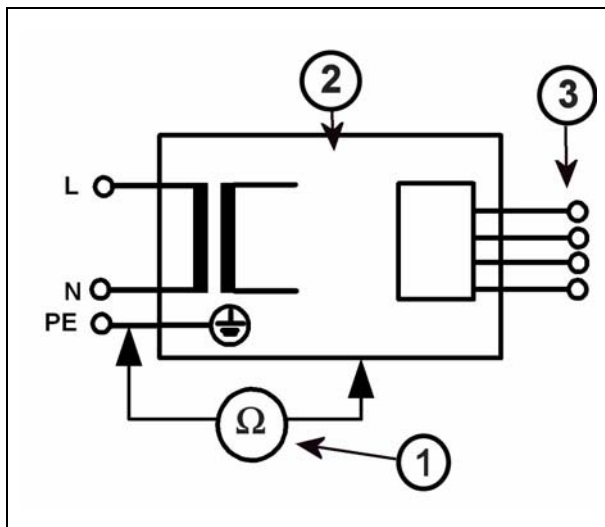


Fig. 1 Measuring circuit for measuring the protective conductor resistance in systems that are separated from the power supply, according to DIN VDE 0751-1:2001-10, Fig. C2.

1 = Measuring arrangement (measuring instrument)

2 = System

3 = Application part (if present)

## Comments:

Date	Remarks	Name	Signature

**Leakage current/report**

System: \_\_\_\_\_

Material number: \_\_\_\_\_

Serial number: \_\_\_\_\_

Customer-spec. ident number: \_\_\_\_\_

**Leakage current**

	First measured value	Repeat measurements value				
System leakage current (highest measured value) [mA]:						
Line voltage during the measurement [V~]:						
System leakage current (corrected value) [mA]:						
(*1) Meas. circuit:						
Meas. inst. type:						
Meas. inst. Ser. No.:						
Meas. inst. calibrated up to:						
Assessment:						
Date:						
Name:						
Signature:						

(\*1) Meas. circuit: See Fig. 2 to Fig. 3, next page

## Measuring circuit

### Direct measurement.

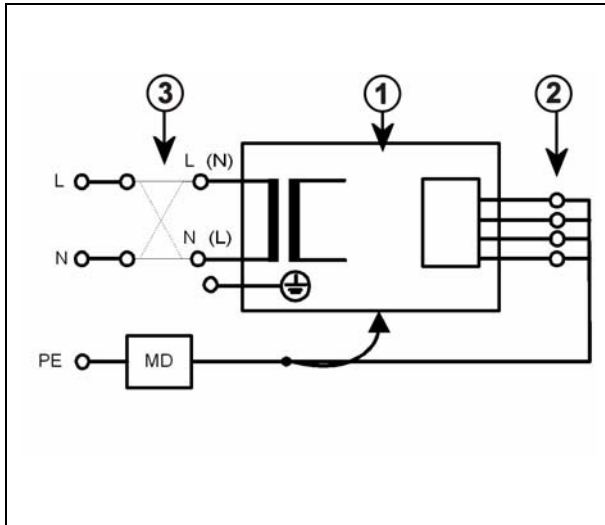


Fig. 2 Measuring circuit for the direct measurement of the system leakage current according to DIN VDE 0751-1:2001-10, Fig. C5 for protective class I.  
 1 = System  
 2 = Application part (if present)  
 3 = Measuring arrangement (integrated in the measuring instrument)

### Differential measurement

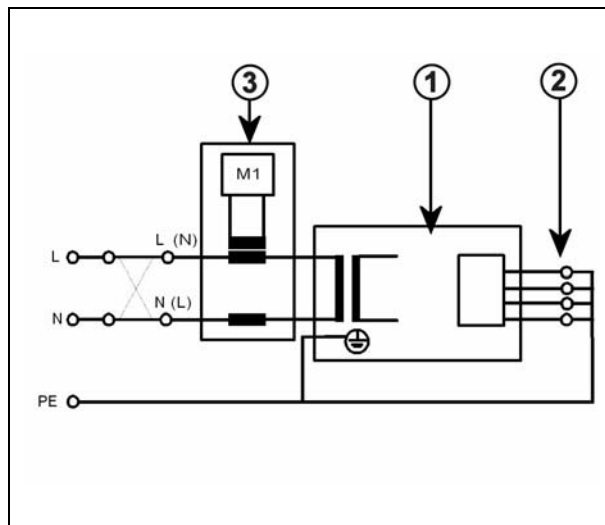


Fig. 3 Measuring circuit for the measurement of the system leakage current according to the differential current method complying with DIN VDE 0751-1:2001-10, Fig. C6 for protective class I.  
 1 = System  
 2 = Application part (if present)  
 3 = Measuring arrangement (integrated in the measuring instrument)

**Comments:**

[illegible]

[illegible]

Chapter	Section	Revision
All	n.a.	Document contains the editorial revision. Danger statements modified to reflect current standards
General	Required Documents	Technical safety check report added
General	Information on the protective conductor resistance test	New section
General	Information on measuring the system leakage current	New section
General	Technical safety checks	New section
Inspection and maintenance	n.a.	Various checks classified as 'important for safety', i.e., the appropriate checkpoints were changed to SIE or SIM
Inspection and maintenance	Visual inspection of the labels	New section
Inspection and maintenance	Visual inspection of customer documentation	New section
Inspection and maintenance	Protective conductor test	Completely rewritten
Inspection and maintenance	Leakage current measurement	Completely rewritten
Inspection and maintenance	Concluding work	"Disinfection" checkpoint deleted
Electrical safety/reports	n.a.	Chapter added





## Polymobil 10

**SP**

### Maintenance protocol

Customer:

Address:

Department:

Room:

Contact person:

Telephone:

Customer number:

CS No.:

Date:

This protocol is accompanied by the  
Maintenance instructions RXR8-120.101.01.05.02

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<b>Telephone:</b>
<b>CSE in charge:</b>
<b>Telephone:</b>

**Notes about the Maintenance Protocol**

The Maintenance Protocol is valid as proof of quality for **one** completed maintenance.

Maintenance must be performed in the specified intervals.

The results of maintenance are entered in this Maintenance Protocol.

The page numbers in the checklists at the end of the protocol refer to the corresponding pages in the associated maintenance instructions (see cover page).

The maintenance protocol must be completed by the CSE. In other words:

- All fields must be filled in. If a field does not apply to the system or if no entry is necessary, check the "n.a." box.
- The customer number (Cust. No.) and the maintenance date must be entered into the header on each page so that every page can be matched to a customer and to a maintenance date.
- In case of complaints, enter the IVKs for the relevant components as well as the type of complaint in the "Open items" table provided. Correction of these open points also must be documented in this table with the date and a signature. If there are no open items, check "No" and document this with the date and a signature.
- If movable components (including test phantoms that are part of the system) are present that can be used in different systems, you must enter them in the "Movable Components" table provided.
- The measurement values for the measurements that must be performed during maintenance must also be entered into the open spaces/tables provided for this.
- When the maintenance is completed, you must fill out and sign page 3 of this protocol.

**Processing and archiving the maintenance protocol**

The Maintenance Protocol is a document and must therefore be archived. After completing maintenance, it must be filed in the appropriate register of the Maintenance binder. If needed, give the customer a copy of it.

**System:****Serial No.:****Software version:****Number of the service contract:****Type of maintenance:**

The system has no deficiencies. The image quality test showed no differences from required reference values.	
The system has minor deficiencies which do not affect system operation. It is recommended, however, to correct them as a preventive measure. The image quality test showed no differences from required reference values.	
The system has serious deficiencies. For safety reasons, continued operation of the system is possible only after the deficiencies have been successfully corrected.	

**Town:****Date:****Technician's name:****Signature:**

### Activities performed

If there is no entry in the table, see the entries beginning on Page 7.

[illegible]

**Open items**

Yes

No

Date/signature: \_\_\_\_\_

If 'Yes', enter the component with the IVK and the open item (number only) into the table.  
Record in the table when maintenance has been completed.

IVK	Component	Open items	Completed	
			(Date)	Signature

**Explanation of abbreviations in the maintenance certificate**

Abbrev.	Description
SI	Safety Inspection
SIE	Electrical Safety
SIM	Mechanical safety
PM	Preventive Maintenance
PMP	Preventive Maintenance, Preventive Parts Replacement, Visual Inspection
PMA	Preventive maintenance adjustments
PMF	Preventive Check of Operating Values/Functions
Q	Quality Check
QIQ	Image Quality Check
QSQ	System Quality
SW	Software Maintenance
CSE	Customer Service Engineer

**Measuring device**

Enter the measuring devices that were used for maintenance in the table.

Measuring device	Type	Serial no.	Date of use	Next calibration due

**Movable Components**

Yes                  No                  Date/signature: \_\_\_\_\_

If 'Yes', enter the component (including Serial No.) into the table that was used for maintenance.

Movable components (including test phantoms that are part of the system) are parts that can be used on different systems.

Movable Component	Serial No.

<b>1</b>	<b>General information</b>	<b>1 - 1</b>
1.1.	Required documents	1 - 1
1.2.	Tools, measurement and auxiliary devices required	1 - 1
1.3.	Required lubricants	1 - 1
1.4.	Text conventions	1 - 2
1.5.	Safety information and protective measures	1 - 3
1.6.	Explanation of abbreviations	1 - 6
1.7.	Information on the ground wire resistance test	1 - 6
1.8.	Information on measuring the leakage current	1 - 8
1.9.	Technical safety checks (TSC)	1 - 11
<b>2</b>	<b>Inspection and Maintenance</b>	<b>2 - 1</b>
2.1.	Visual inspection	2 - 1
2.1.1	Check the system for damage	2 - 1
SIM	Cover panels	2 - 1
SIM	Switch box/control console	2 - 1
SIM	Release cable	2 - 1
SIM	Power and primary cable	2 - 1
2.1.2	Labels	2 - 1
SIM	Labels	2 - 1
2.1.3	Customer documents	2 - 1
SI	Customer documentation	2 - 1
2.2.	Check screws	2 - 1
SIM	Cassette holder	2 - 1
SIM	Pedals	2 - 1
SIM	Front wheels	2 - 1
2.3.	Check handles	2 - 1
SIM	Single tank holder	2 - 1
SIM	Single tank	2 - 1
SIM	Control handle above the control console	2 - 1
2.4.	Check wheels	2 - 3
SIM	Noises	2 - 3
SIM	Easy movement	2 - 3
SIM	Wear of the rubber lining	2 - 3
2.5.	Check pedal positions	2 - 3
SIM	Brakes/Locking	2 - 3
SIM	Maneuvering	2 - 3
SIM	Straight travel	2 - 3
2.6.	Single tank	2 - 4
SIM	Suspension	2 - 4
SIM	Locking mechanism	2 - 4
2.7.	Double-slot diaphragm	2 - 5
PMF	Light localizer lamp	2 - 5
SIM	Rotatability	2 - 5
PMF	Format setting	2 - 5
PMF	0° position	2 - 5

	OK	not OK	n.a.	Page
<b>2.8. Stand</b>				<b>2 - 6</b>
SIM Support arm locking mechanism				2 - 6
SIM Stand mounting				2 - 7
SIM Spring counterbalance				2 - 7
SIM Chains of the spring counterbalance system				2 - 7
PMP Maintenance of the joints and chains				2 - 8
<b>2.9. Radiation</b>				<b>2 - 8</b>
SIE Radiation indicator				2 - 8
SIE Acoustic signal				2 - 8
PMF kV and tube current (IR)				2 - 9
QSQ Check if light and radiation fields match				2 - 10
<b>2.10. Control console</b>				<b>2 - 11</b>
SIE Operating elements				2 - 11
SIE Displays				2 - 11
<b>2.11. Ground wire test</b>				<b>2 - 12</b>
SIE Protective conductor test				2 - 12
<b>2.12. Leakage current measurement</b>				<b>2 - 13</b>
SIE Leakage current measurement				2 - 13
<b>2.13. Concluding work</b>				<b>2 - 14</b>
PMP Cleaning				2 - 14
<b>3 Electrical safety/Reports</b>				<b>3 - 1</b>
<b>3.1. Protective conductor resistance/report</b>				<b>3 - 1</b>
<b>3.2. System leakage current/report</b>				<b>3 - 3</b>
<b>4 Changes to previous version</b>				<b>4 - 1</b>